UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P O. Box 1450
Alexandria, Virginia 22313-1450
www uspto gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,979	01/29/2004	Brian T. Denton	BUR920030198US1	1978

29154 7590 05/13/2010

FREDERICK W. GIBB, III
Gibb Intellectual Property Law Firm, LLC
844 West Street
SUITE 100
ANNAPOLIS, MD 21401

EXAMINER	
FLEISCHER, MARK A	
ART UNIT	PAPER NUMBER
3624	

NOTIFICATION DATE	DELIVERY MODE
05/13/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

support@gibbiplaw.com

Office Action Summary	Application No.	Applicant(s)	
	10/707,979	DENTON ET AL.	
	Examiner	Art Unit	
	MARK A. FLEISCHER	3624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 February 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1, 2, 4 - 11, 13 - 17, 19 - 24, 26 and 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 2, 4 – 11, 13 – 17, 19 – 24, 26 and 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *15 April 2010, 10 Mar. 2010 and 1 Mar. 2010*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. This final Office action is in reply to the amendments filed on 8 January 2010.
2. Claims 1, 2, 5, 7, 8 – 11, 15 – 17 and 21 – 24 have been amended.
3. Claims 3, 12, 18 and 25 have been cancelled.
4. Claims 1, 2, 4 – 11, 13 – 17, 19 – 24, 26 and 27 are currently pending and have been examined.

Response to Amendments

5. Examiner maintains the objections to claims 1, 7, 8, 10, 15, 16, 21 and 23 for reasons set forth below.
6. Examiner withdraws the objections to claims 9 in light of Applicant's amendments.
7. The rejection of claims 10, 16 and 23 under 35 U.S.C. §112, second paragraph are reasserted in light of Applicant's amendments. Note also the related objections below.
8. The rejections of claims 1, 5, 7, 8, 10, 15, 16, 21 and 23 under 35 U.S.C. §112, second paragraph are maintained.
9. The rejection of claims 1 – 7 inclusive under 35 U.S.C. §101 are withdrawn in light of Applicant's amendments.

Response to Arguments

10. Applicant's arguments received on 8 January 2010 have been fully considered but they are moot in light of new grounds of rejection. Referring to the previous Office action, Examiner has cited relevant portions of the references as a means to illustrate the systems as taught by the prior art. As a means of providing further clarification as to what is taught by the references used in the first Office action, Examiner has expanded the teachings for comprehensibility while maintaining the same grounds of rejection of the claims, except as noted above in the section labeled "Status of

Claims." This information is intended to assist in illuminating the teachings of the references while providing evidence that establishes further support for the rejections of the claims.

11. While Applicant has addressed some of the issues as noted in the prior Office action, many of the claims continue to suffer from awkward or confusing language as noted in the rejections below. Examiner has also provided further art to supplement those of the prior Office action. Applicant is encouraged to set up a phone interview so that the claims can be thoroughly discussed and issues clarified in the interests of advancing prosecution.

Information Disclosure Statement

12. The Information Disclosure Statements filed on 1 and 10 March 2010 and 15 April 2010 have been considered. Initialed copies of the Form 1449 are enclosed herewith.

Claim Objections

13. **Claims 1, 7, 8, 10, 15, 16, 21 and 23** are objected to for informalities. Examiner notes with appreciation Applicant's attempt to clarify the claims; however the claims as written still suffer from problems as noted in the previous Office action and further amplified below:

- **Claims 1 and 15:** Examiner appreciates Applicant's efforts to cure the defects in this claim. The claim however still lacks clarity. As noted below in greater detail, the phraseology is confusing in part because there appears to be missing steps. Also the language is unnecessarily confusing. The claim recites "assigning... resources to different customers having prioritized customer demands by iteratively solving..." Should this not read that the assigning is done *in accordance* with solutions obtained by iteratively solving LPs and/or *in accordance* with a priority level? Also, is there not a step where the priority assignment or determining the priority level effected? Examiner interprets the claim as allocations are based on sequentially computed solutions to groups with groups having higher priority levels first and that once a higher level allocation is made, the allocation to lower level ranking groups are made based on the current, remaining supply (*i.e.,* consistent with).

- **Claims 7 and 8:** The claim refers to "higher prioritized customer demands before solving for lower priorities" where the claim is confusing. Is it the customer that has a priority, or is it the demand or demand level that has priority? The former seems more sensible, yet this is not clear from the phraseology. Also, the last phrase of claim 7 refers implicitly to customer demands, as in "...before solving for lower priorities." This leaves the claim somewhat vague.
- **Claims 10, 16 and 23,** as amended, recite that "...each different linear programming model uses as an initial constraint a program solution of the previous linear programming model" and is confusing in light of standard reference to linear programs. It appears that Applicant is attempting to convey that each different linear program incorporates, as a constraint, the solution of the previous linear program. Applicant should clarify this claim.
- **Claim 21** still has problematic phraseology. In particular "prioritized customer demands" is confusing. It also seems to involve a ranking of customers according to their demand and then assigning resources based on the ranking and/or in proportion to the relative demand. Applicant should clarify this claim.

Claim Rejections - 35 USC § 112

14. The following is a quotation of the second paragraph of 35 U.S.C. §112:

    The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

15. Claims 1, 5, 7, 8, 10, 15, 16, 21 and 23 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

    - **Claims 1, 7, 8, 15 and 21:** numerously recite that an assignment of resources is effected, but the entity to which something is allocated is still unclear and vague. In claim 1, for example, there is an assigning step where resources are assigned "to different customers having prioritized customer demands..." and "assigning....a range of ... backorder costs" where it continues "... to which resources are ... being assigned.", and "...group(s) of prioritized

demands"... This phraseology is confusing and nonsensical as further amplified in the claim objections above. The notion of assigning, which reasonably refers to a resource to be allocated or at least associated with a customer, 'a range of [ ] backorder costs...' also makes no sense as a backorder cost is not a resource. Although Applicant has replaced the term 'allocating' with the term 'assigning' as suggested in the previous Office action, the amendments still do not address the more fundamental issues regarding the problematic phraseologies as noted above. The claims also recite "... each iterative solution for remaining ones of said plurality of sets of priorities customer demands using results..." is more than awkward. It is difficult to fathom the meaning of this limitation given this phraseology. Consequently, these claims are vague and indefinite.

- **Claim 5:** This claims recites "...solution to subsequent iterations are equal to previous solutions..." makes no sense as it is written. If the solution to a subsequent iteration is equal to the previous one, then what is the purpose of doing an iteration? There appears to be some confusion as to what the purpose is of performing an 'iteration' and how a new linear program should incorporate the solution of a previous stage into the set of constraints. The manner in which this claim is written renders the claim vague and indefinite. For purposes of examination, Examiner interprets this as meaning that the solution of a previous stage is incorporated in successive linear programs as a constraint to ensure that subsequent solutions are feasible solutions for the previous models.
- **Claims 10, 16 and 23:** These claims recite the phrase 'as an initial constraint' and is vague and indefinite. See the preceding paragraph regarding the rejection of claim 5. The underlying issue appears to revolve around what a solution cycle involves and how each new linear program (model) incorporates as a constraint (a linear program includes an objective function and a set of constraint equations), the solution of the previous cycle.

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. Claims 1, 2, 5 and 6 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hegde, et al. (US 7197469 B2) in view of Nagarur, et al. (*Production planning and scheduling for injection moulding of pipe fittings: A case study*).

Claim 1:

Hegde teaches the following limitations as shown.

- *assigning, by a computing device, resources* (Hegde [abstract] teaches "allocating resources including component supply…") *to different customers having prioritized customer demands* (Hegde [2,21] refers to customers demand as in a supply chain. Hegde [4,31] states "allocating resources sequentially at each level based on a priority ranking…" (emphasis added)) *by iteratively solving mathematical linear programs* (Hegde [12,19] refers to iteration and Hegde [4,31] teaches using "linear programming"),
- *optimizing, by said computing device, each mathematical linear program according to one of a plurality of sets of prioritized customer demands wherein each set contains a plurality of prioritized customer demands* (Hegde in at least [2,50], *inter alia* teaches a method for optimizing associated with "demand prioritization techniques". Hegde [6,60] refers to a match between assets and demands based on "specified levels of the Bill of Materials..." which corresponds to the *plurality of sets of...*),
- *determining, by said computing device, each iterative solution for remaining ones of said plurality of sets of priorities customer demands using results from a previous mathematical linear program*

solution (Hegde [abstract] teaches a system and method "for the optimal allocation of supply and capacity over time that satisfy two key requirements (a) being consistent with accepted operational objectives (e.g. low inventory, short lead times, prioritized allocation of supply and capacity) […]" (emphasis added) where the consistency is with the previous allocation hence consistent with the previous solution.)*;*

- *outputting, by said computing device, said production plan based on optimizing said each mathematical linear program and determining each iterative solution* (Hegde [abstract] refers to a feasible production schedule, and in [11,13] refers to an output of the production scheduling system. Hegde in [4,8] refers to use of linear programming techniques which are used to compute the production plan)*,*
- *independently determining backorder costs penalties for each set of prioritized customer demands using said computing device* (Hegde [5,5] refers to back ordering as a typical element of BCD (Best Can Do) which uses linear programming as described in Hegde [4,26-7]. Note that in Hegde [5,7] states "material releases of equal priority have equal cost penalties ..." thus contemplates prioritization associated "with rationing resources", hence is associated with prioritized demands, but see below.)*; and*
- *assigning, by said computing device, by each successive linear programming model, a range of said backorder costs within a priority group to which resources are currently being assigned* (Hegde [13,30] *inter alia* describes in Hegde claims 1 – 3 a grouping process based on priority. Hegde [5,2-7] states "As is known, LP used in BCD is formulated as a cost minimization problem where the objective function is comprised of costs for processing, shipping, back ordering, inventory holding, and material substitution, as well as negative revenues, all of which are linear in their respective decision variables." Note that Hedge does not teach that such groups are assigned backorder costs *per se*, but as shown above, Hedge [5,5] does describe costs for backordering and the need to match assets with demand –[2,17]–, and the rationing of resources among competing demands –[1,25]).

Hegde does not specifically teach use of *successive linear programming models, per se,* or that *each iterative solution uses results from a previous mathematical linear program solution,* but Nagarur, in an analogous art, does. Nagarur [abstract] refers to a sequence of sub-problems involving use of linear programming methods. Nagarur [p.162, col. 2] further states "Establish the equivalent linear programming model for this priority level k. All the solutions obtained from previous steps are included as additional constraints." (emphasis added) hence corresponds to the aforementioned limitation. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add additional constraints indicating the allocation of supply for that stage and wherein such additional constraint by definition maintains feasibility with the previous stage. The technique of using a sequence of linear programming models wherein the solution to one stage provides constraints for successive stages would have been known to one of ordinary skill in the art and the benefits of the resulting combination with the use of linear programming models to provide prioritization of demands would have been predictable.

Claim 2:

Hegde teaches the following limitations as shown.

- *said prioritized customer demands are hierarchical and comprises two or more levels of hierarchy* (Hegde [2,60] teaches a set of hierarchical tiers and based on priority allocations Hegde [2,21] further refers to "customers demand" upon which the hierarchies are based.).

Claim 5:

Hegde does not specifically teach the following limitation, but Nagarur, in an analogous art, does as shown.

- *adding constraints to said mathematical linear programs at each iteration to ensure that solutions to subsequent iterations are equal to previous solutions* (Nagarur [abstract] refers to a sequence of subproblems involving use of linear programming methods. Nagarur [p.162, col. 2] further states "Establish the equivalent linear programming model for this priority level k. All the solutions obtained from previous steps are included as additional constraints." (emphasis added) hence corresponds to the aforementioned limitation and as noted in the prior Office action,

Examiner takes **as admitted prior art** that it is old and well-known as well as common place in the mathematical sciences that mathematical programs, and in particular, dynamic programming problems are problems that are posed in a well-defined formulation wherein adding additional constraints in one stage maintains feasibility in the previous stage or within the problem definition without the additional constraint.)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add additional constraints indicating the allocation of supply for that stage and wherein such additional constraint by definition maintains feasibility with the previous stage. The technique of using a sequence of linear programming models wherein the solution to one stage provides constraints for successive stages would have been known to one of ordinary skill in the art and the benefits of the resulting combination with the use of linear programming models to provide prioritization of demands would have been predictable.

Claim 6:

Hegde teaches the following limitations as shown.

- *said method uses a different mathematical linear program for each iteration* (Hegde [2,10] refers to multiple stages.)

Hedge does not specifically state that there is a new linear program for each iteration (stage), but Nagarur, in an analogous art, does. See the rejection of claims 1 and 5 above. Furthermore, Examiner takes as **admitted prior art** that it is old and well-known as well as common place in the dynamic programming sciences to use a new formulation of a linear program by adding constraints based on prior allocations and such new constraints, *ipso facto,* result in a different mathematical linear program. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add additional constraints indicating the allocation of supply for that stage and wherein such additional constraint by definition maintains feasibility with the previous stage. The technique of using a sequence of linear programming models wherein the solution to one stage provides constraints for successive stages would have been known to one of ordinary skill in the art and the benefits of the

resulting combination with the use of linear programming models to provide prioritization of demands would have been predictable.

18. Claims 8, 9, 15, 21 and 22 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hegde, et al. (US 7197469 B2) in view of Nagarur, et al. (*Production planning and scheduling for injection moulding of pipe fittings: A case study*) and further in view of Hung, et al. (*A Production Planning Methodology for Semiconductor Manufacturing Based on Iterative Simulation and Linear Programming Calculations*).

Claims 8, 15 and 21:

Although claims 8, 15 and 21 are worded and/or structured slightly differently, they have the same scope and so are addressed together. Hegde teaches the following limitations as shown.

- *assigning, by a computing device, resources* (Hegde [abstract] teaches "allocating resources including component supply…") *to different customers having prioritized customer demands* (Hegde [2,21] refers to customers demand as in a supply chain. Hegde [4,31] states "allocating resources sequentially at each level based on a priority ranking…" (emphasis added)) *by iteratively solving mathematical linear programs* (Hegde [12,19] refers to iteration and Hegde [4,31] teaches using "linear programming"),
- *optimizing, by said computing device, each mathematical linear program according to one of a plurality of sets of prioritized customer demands wherein each set contains a plurality of prioritized customer demands* (Hegde in at least [2,50], *inter alia* teaches a method for optimizing associated with "demand prioritization techniques". Hegde [6,60] refers to a match between assets and demands based on "specified levels of the Bill of Materials..." which corresponds to the *plurality of sets of...*),
- *determining, by said computing device, each iterative solution for remaining ones of said plurality of sets of priorities customer demands using results from a previous mathematical linear program solution* (Hegde [abstract] teaches a system and method "for the optimal allocation of supply and capacity over time that satisfy two key requirements (a) being consistent with accepted operational objectives (e.g. low inventory, short lead times, prioritized allocation of supply and

capacity) […]" (emphasis added) where the consistency is with the previous allocation hence consistent with the previous solution.);

- *outputting, by said computing device, said production plan based on optimizing said each mathematical linear program and determining each iterative solution* (Hegde [abstract] refers to a feasible production schedule, and in [11,13] refers to an output of the production scheduling system. Hegde in [4,8] refers to use of linear programming techniques which are used to compute the production plan),
- *independently determining backorder costs penalties for each set of prioritized customer demands using said computing device* (Hegde [5,5] refers to back ordering as a typical element of BCD (Best Can Do) which uses linear programming as described in Hegde [4,26-7]. Note that in Hegde [5,7] states "material releases of equal priority have equal cost penalties ..." thus contemplates prioritization associated "with rationing resources", hence is associated with prioritized demands, but see below.); *and*
- *assigning, by said computing device, by each successive linear programming model, a range of said backorder costs within a priority group to which resources are currently being assigned* (Hegde [13,30] *inter alia* describes in Hegde claims 1 – 3 a grouping process based on priority. Hegde [5,2-7] states "As is known, LP used in BCD is formulated as a cost minimization problem where the objective function is comprised of costs for processing, shipping, back ordering, inventory holding, and material substitution, as well as negative revenues, all of which are linear in their respective decision variables." Note that Hedge does not teach that such groups are assigned backorder costs *per se*, but as shown above, Hedge [5,5] does describe costs for backordering and the need to match assets with demand –[2,17]–, and the rationing of resources among competing demands –[1,25]).
- *allocating, by said computing device, said resources to the highest priority group of prioritized demands using a first linear programming model* (Hegde [13,45] refers to priority ranked release of materials which corresponds to an allocation. Hegde [5,2] indicates such allocations are effected by LP models.);

Hegde does not specifically teach

- *allocating, by said computing device, remaining resources to the next highest priority group of prioritized demands using a second linear programming model, wherein said second linear programming model uses results from said first linear programming model; and*
- *repeating said process of allocating remaining resources, by said computing device, to the remaining groups of prioritized demands in order of priority,*

but Nagarur, in an analogous art, does. Nagarur [abstract] refers to a sequence of subproblems involving use of linear programming methods. Nagarur [p.162, col. 2] further states "Establish the equivalent linear programming model for this priority level k. All the solutions obtained from previous steps are included as additional constraints." (emphasis added) hence corresponds to the aforementioned limitation. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add additional constraints indicating the allocation of supply for that stage and wherein such additional constraint by definition maintains feasibility with the previous stage. The technique of using a sequence of linear programming models wherein the solution to one stage provides constraints for successive stages would have been known to one of ordinary skill in the art and the benefits of the resulting combination with the use of linear programming models to provide prioritization of demands would have been predictable.

Neither Hegde nor Nagarur specifically teach the following limitations, but Hung, in an analogous art, does as shown.

- *aggregating, by said computing device, said prioritized demands into different priority groups* (Hung [259, col.1] states "These demands are divided into prioritized *classes* that are loaded onto front end facilities by incremental linear programming calculations.");

Hung provides teachings for production planning in a manufacturing setting using iterative linear programming calculations and therefore would have been known to one of ordinary skill in the art at the time of the instant invention. Combining the teachings of Hung with those of Hegde and Nagarur would provide a methodology very similar to those claimed and in light of these teachings, the instant invention would have been obvious. These teachings provide a sequential and optimal allocation of resources

based on prioritized demands as taught in Hegde, Nagarur and Hung and their combination would therefore have been predictable.

Claims 9 and 22:

Hegde teaches the following limitations as shown.

- *when repeating said process of assigning remaining resources, said method uses a different linear programming model for each repetition of said process of assigning remaining resources* (see the rejection of claim 6).

Hedge does not specifically state that there is a new linear program for each iteration (stage), but Hung, in an analogous art does. Hung [abstract] describes and/or discloses using a reformulated LP model for a revised planning calculation. Such models are used in an iterative fashion. Moreover, Examiner takes **as admitted prior art** that it is old and well-known as well as common place in the dynamic programming sciences to use a new formulation of a linear program by adding constraints based on prior allocations and such new constraints, *ipso facto,* result in a different mathematical linear program. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde, and what is old and well-known in the art as the use of optimization techniques such as linear programming sequentially applied to prioritized groups in a hierarchy would promote optimal resource allocations to such higher priority groups and one of ordinary skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

19. Claims 4, 7, 10, 11, 13, 14, 16, 17, 19, 20, 23, 24, 26 and 27 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hegde, et al. (US 7197469 B2) in view of Nagarur, et al. (*Production planning and scheduling for injection moulding of pipe fittings: A case study*) and further in view of de Farias (*The Linear Programming Approach To Approximate Dynamic Programming: Theory And Application*) and further in view of Fakhouri, et al. (US 746147 B1) and further in view of Leachman, et al. (*IMPReSS: An Automated Production-Planning and Delivery-Quotation System at Harris Corporation-Semiconductor Sector*).

Claim 4:

Hegde does not specifically teach the following limitations as shown, but Fakhouri, in an analogous art, does.

- *said mathematical linear programs solved in each iteration use the solution to the previous mathematical linear program as a starting solution* (Fakhouri [36,18] states "A scheme for performing the allocation of various resources based on the values for the various resources in the integer solution solution [*sic*] obtained in the previous step." See also the rejection of claim 3 above.).

Examiner takes **admitted prior art** that it is old and well-known as well as common place in the management sciences that decision/allocation problems with multiple stages are often posed as dynamic programming problems wherein each stage provides the starting point or allocation for the next stage. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde, Nagaruru, deFarias, Fakhouri and Leachman and what is old and well-known in the art as the use of optimization techniques such as linear programming sequentially applied to prioritized groups in a hierarchy would promote optimal resource allocations to such higher priority groups and one of ordinary skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

Claim 7:

Hegde [2,21] refers to customer demands, but does not specifically teach the following limitations as shown, but Fakhouri, in an analogous art, does.

- *said assigning process solves said mathematical linear programs for higher prioritized customer demands before solving for lower priorities* (Fakhouri [5,14] states "For example, if two resources depend on a resource that can only support one of them, then one way to resolve the conflict is to allocate the scarce resource to the resource with higher priority.").

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde and Fakhouri and what is old and well-known in the art as the use of optimization techniques such as linear programming sequentially applied to prioritized groups in a

hierarchy would promote optimal resource allocations to such higher priority groups before lower priority groups and one of ordinary skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

Claims 10, 16 and 23:

Hegde does not specifically teach the following limitations as shown, but Fakhouri, in an analogous art, does.

- *each different linear programming model uses as a starting point a program solution of the previous linear programming model* (see the rejection of claims 3 and 4 which cite Fakhouri regarding lower-level resource allocations.).

Examiner takes **as admitted prior art** that it is old and well-known as well as common place in the management sciences that decision/allocation problems with multiple stages are often posed as dynamic programming problems wherein each stage provides the starting point or allocation for the next stage. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde, Fakhouri and Leachman and what is old and well-known in the art as the use of optimization techniques such as linear programming sequentially applied to prioritized groups in a hierarchy would promote optimal resource allocations to such higher priority groups and one of ordinary skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

Claims 11, 17 and 24:

Hegde does not specifically teach the following limitations as shown, but Fakhouri, in an analogous art, does.

- *during said allocating processes, each linear programming model fixes variables associated with priority groups that have a lower priority than the priority group to which the resources are currently being allocated* (Fakhouri [38,40-2] teaches fixing variables according to the solutions of previous stages.). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde and Fakhouri because both refer to resource allocation decisions that are prioritized in a hierarchical fashion and wherein resource

allocation decisions associated with higher priority, hence established in earlier stages are fix thereby adding constraints so that subsequent formulations remain feasible for earlier ones and one of ordinary skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

Claims 13, 19 and 26:

Hegde teaches the following limitation as shown.

- *dividing said priority groups into different sub-priority tiers* (Hegde [2,36] teaches a tiered planning system and where each tier comprises a range such as "3 months to 7 yr" (Hegde [2,42]) which constitute a set of sub-priority levels. See also Hegde [16,34-38] which teaches "additional level of priority").

Claims 14, 20 and 27:

Hegde, does not specifically teach *said sub-priority tiers can be processed simultaneously,* but Fakhouri, in an analogous art, does. Fakhouri [4,55] teaches satisfying multiple constraints simultaneously, and in [26,15] states "Tasks are defined such that (a) each task is computationally significant as to the bookkeeping costs of managing parallelism" (emphasis added) where 'parallelism' indicates simultaneous processing. Furthermore, Examiner takes **as admitted prior art** that it is old and well-known as well as common place in the data processing arts to enable processes to be performed either separately or in parallel, *i.e.,* simultaneously. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to enable separate or simultaneous processing of resource allocation decisions depending on what is necessary and convenient and one of ordinary skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry of a general nature or relating to the status of this application or concerning this communication or earlier communications from the Examiner should be directed to **Mark A. Fleischer** whose telephone number is **571.270.3925.** The Examiner can normally be reached on Monday-Friday, 9:30am-5:00pm. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's acting supervisor, **Beth Boswell** whose telephone number is **571.272.6737** may be contacted.

The prior art made of record and not relied upon that is considered pertinent to applicant's disclosure are:

- Hegde, et al. (US 6701201 B2)
- Huang, et al. (US 6151582 A)
- Howie, et al. (US 5093794 A)
- Kirby, et al. (US 6498786 B1)
- Shekar, et al. (US PgPub 20030208392 A1
- Lyon, et al. (*Matching Assets with Demand in Supply-Chain Management at IBM Microelectronics*)

and teach various forms of resource allocation and/or optimization using multi-stage linear programming techniques deemed relevant by the Examiner.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://portal.uspto.gov/external/portal/pair <http://pair-direct.uspto.gov >. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at **866.217.9197** (toll-free).

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

P.O. Box 1450

Alexandria, VA 22313-1450

or faxed to **571-273-8300**.

Hand delivered responses should be brought to the **United States Patent and Trademark Office Customer Service Window**:

Randolph Building

401 Dulany Street

Alexandria, VA 22314

Mark A. Fleischer
/Mark A Fleischer/
Examiner, Art Unit 3624 8 May 2010

/Andre Boyce/
Primary Examiner, Art Unit 3623